

Ecology

Chapter 3



Photo by <http://www.flickr.com/photos/druclimb/56763994/in/photostream/>

ECOLOGY - the study of interactions among organisms with each other and with environment

BIOSPHERE - portion of planet where life exists



LEVELS OF ORGANIZATION

Species - individuals that can breed with one another

Population - all the individuals of the same species (ducks) in an area



A population is
always composed
of same-species
organisms



Party



Mardi Gras



Spa



Casino



Events



Cowboy



Indian



Cupid



Workout



Chef



Tennis



Football



Baseball



Hockey



Snorkel



Knight



Biker



Ballerina



Doctor



Dentist



Sailor



Fireman



Pirate



Plumber



Contruction

Community - all the populations that live together in an area



What is in your backyard community?

Ecosystem - the community plus the physical factors in an area (rain, light, soil..)

Examples:

Rotting Log

Koi Pond

Lake

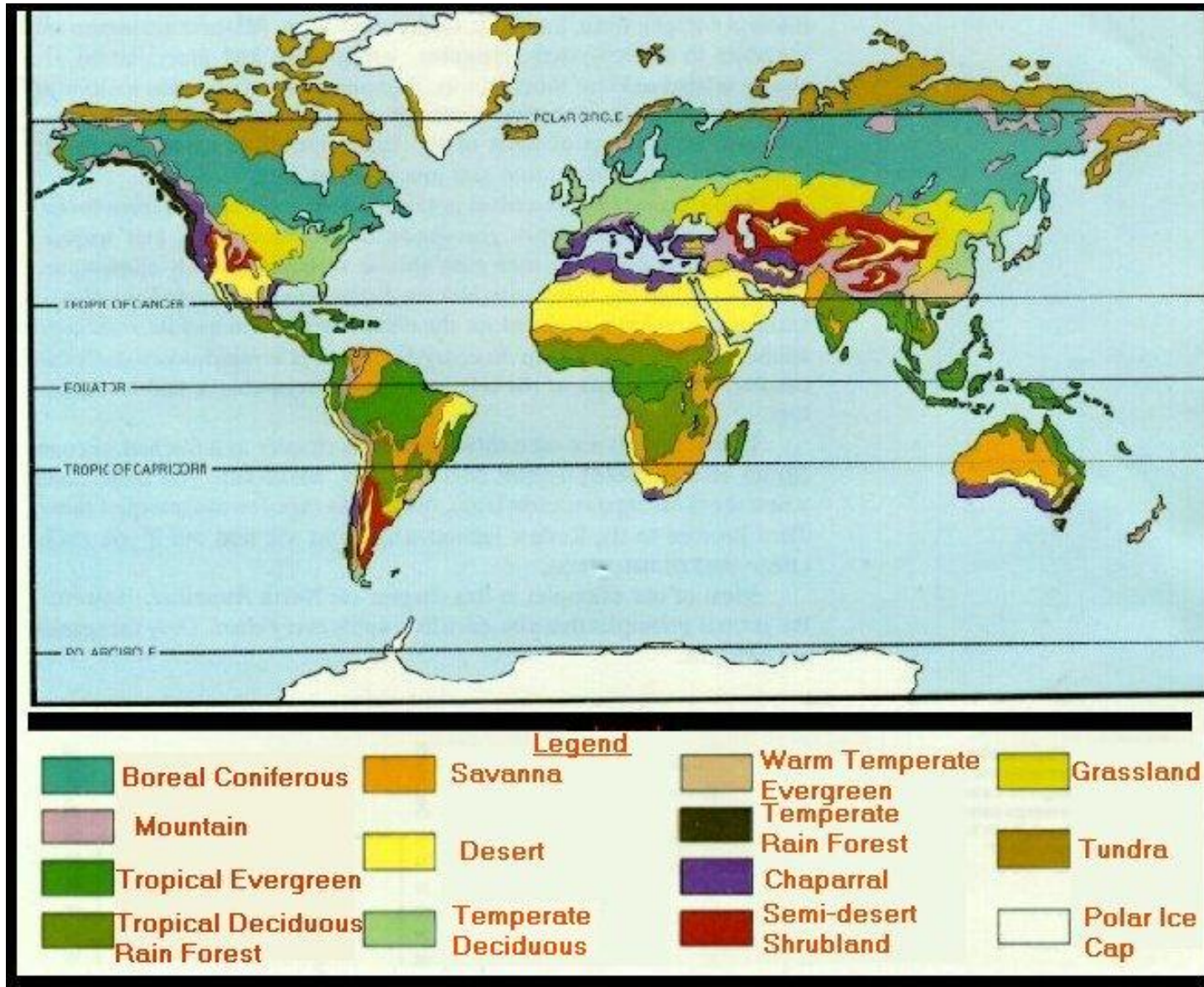
Clump of Dirt

A field

An old maple tree



Biome - large area that has a particular climate, and particular species of plants and animals that live there (tundra)



Biosphere - the part of the earth that supports life



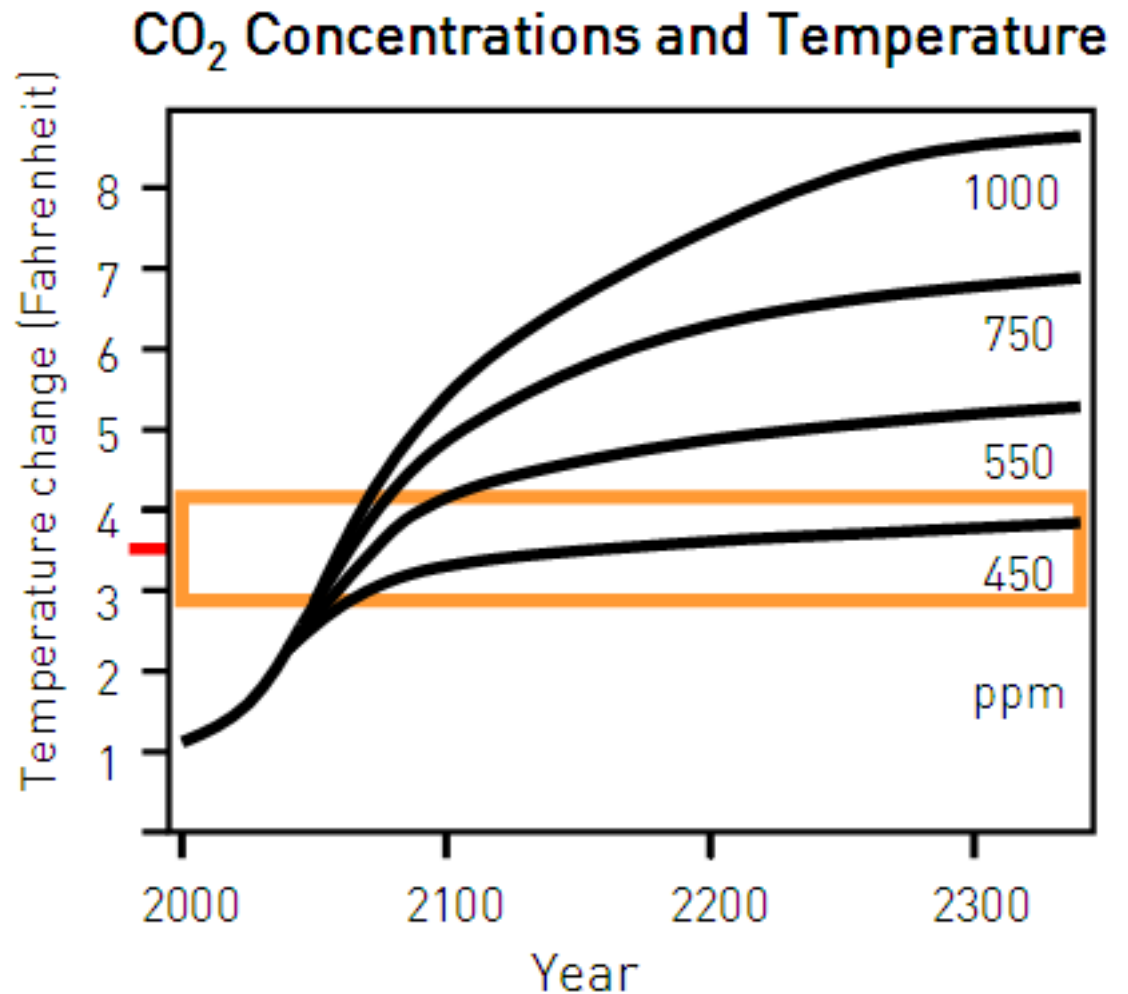
Quick Check

1. All the different populations in an area make up the
a) biosphere b) ecosystem c) community
2. Ecology is the study of the _____ of organisms with the environment.
3. The part of the earth that can support life is the _____.
4. All the living and non-living factors in an area make up the:
a) population b) ecosystem c) community
5. A desert, rain forest, tundra and grassland are all different kinds of:
a) biospheres b. biomes c) biotics

Ecological Methods - how do we study ecology?

Observing -
Experimenting
Modeling

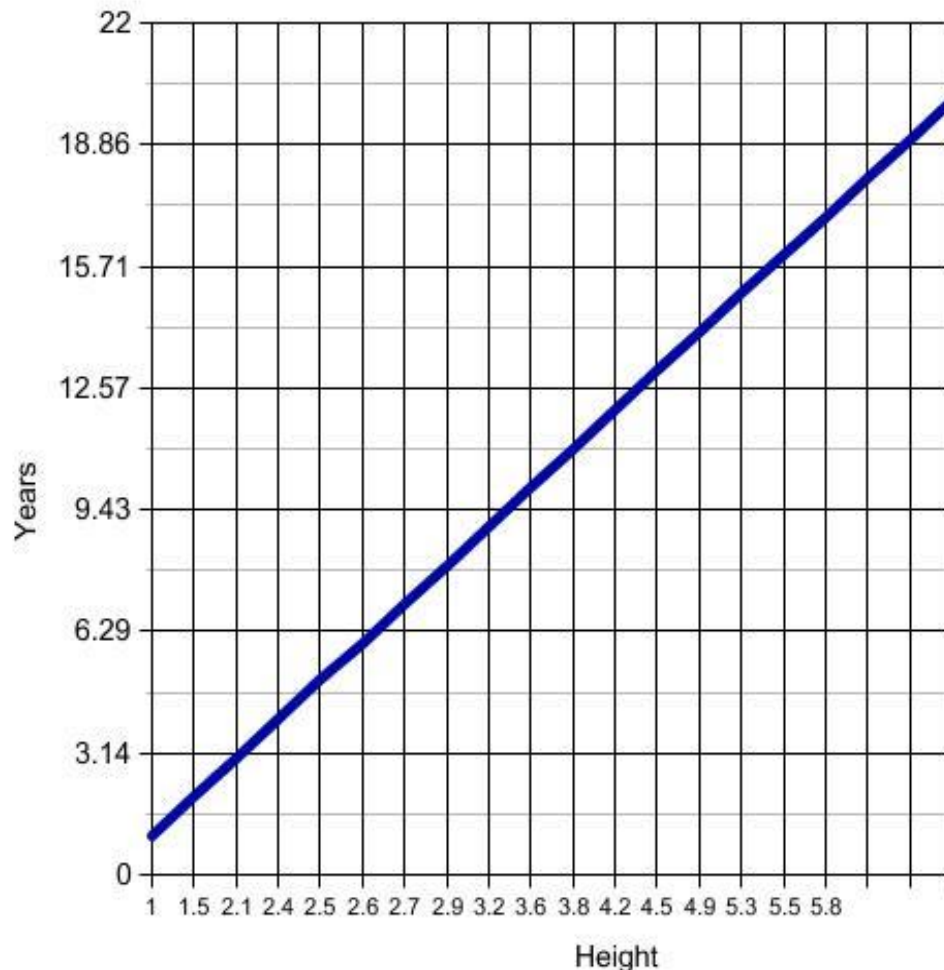
Models are used to
make predictions.



Sometimes, you must be cautious in how a model interprets data....

Imagine graphing a person's height as they age. One could predict that by the time they were age 30, they would be 22 feet tall.

However, the model would need to account for the slowing of growth after adolescence.

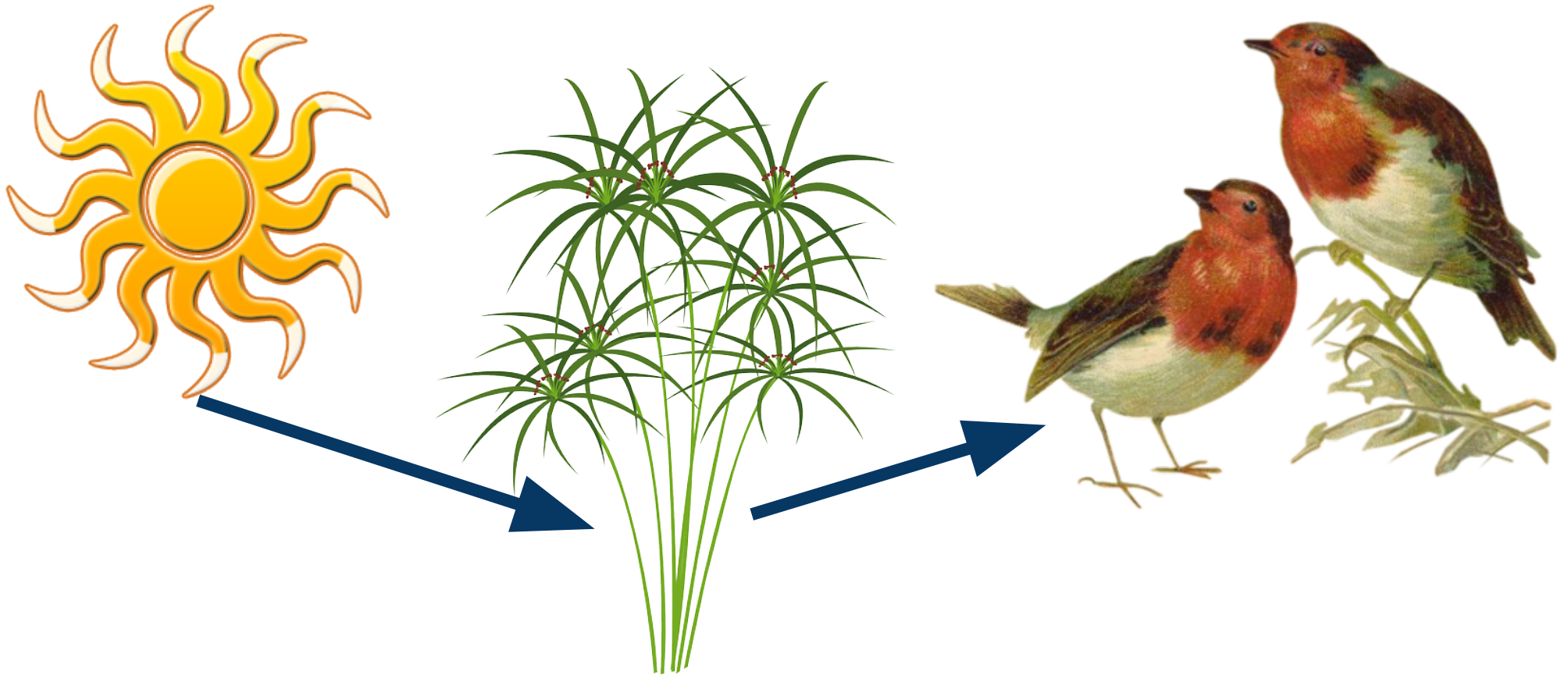


1. A group of animals that live in the same area and can interbreed is called a (n) _____
2. The study of organisms and their interactions with the environment is known as _____
3. A large area that has a particular climate and distinct plants and animals is called a _____
4. All of the different populations living in an area (plants, rabbits, coyotes...) is called the _____
5. An ecosystem includes all the living and _____ factors in an area.
6. The portion of the planet that can sustain life is the _____
7. Animals that can interbreed are called a(n) _____

3-2 Energy Flow

Autotrophs (producers) - capture energy and convert to "food"
Ex. Plants

Heterotrophs (consumers) - must eat things
Ex. Animals



Types of Consumers

Herbivores

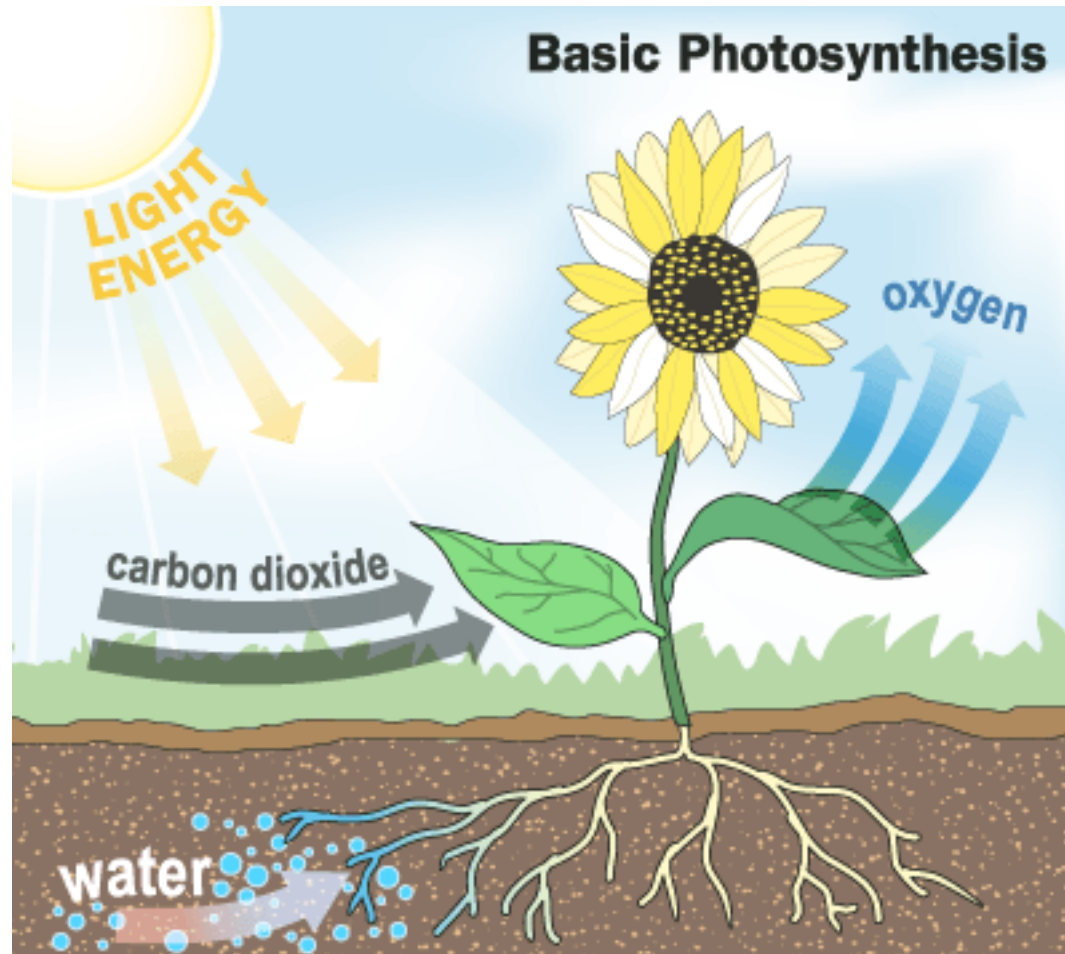
Carnivores

Omnivores

Detritivores / Decomposers

SUNLIGHT is the main source of energy

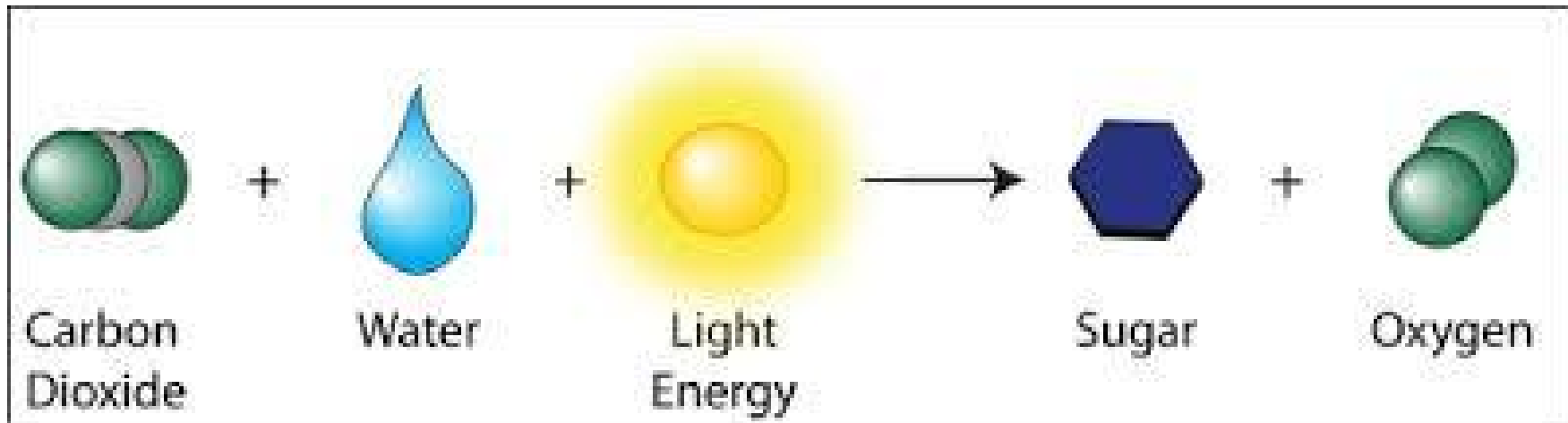
Photosynthesis - uses light energy to make "food"



Photosynthesis



carbon dioxide + water \longrightarrow glucose + oxygen



***You need to know this equation for the test!**

Chemosynthesis - makes food from chemicals (some bacteria do this)

Some bacteria live in deep ocean vents, and make their food from chemicals in those vents

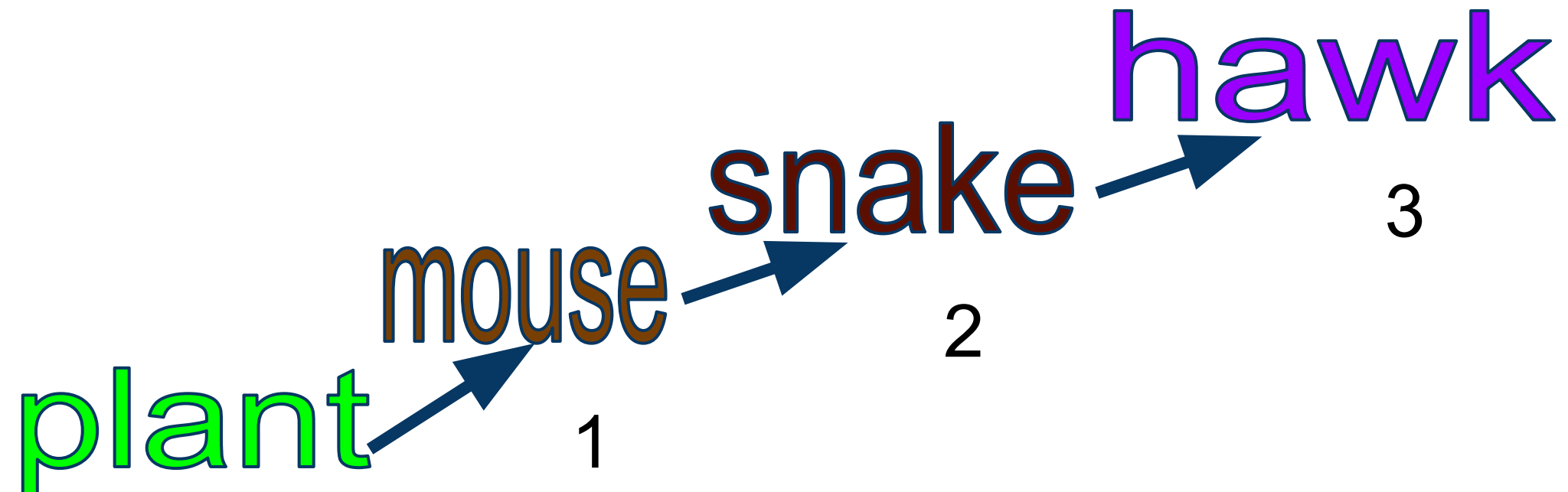


FOOD CHAINS AND FOOD WEBS

- shows the flow of energy in an ecosystem

*Note the direction of the arrows, they indicate where the energy is going when one organism consumes another.

Each step in a chain or web is called a
TROPHIC LEVEL



Primary Productivity

the rate at which organic matter is created by producers

More plants = more productivity.

Which of the following ecosystems has the greatest primary productivity?

a) rain forest



b) desert



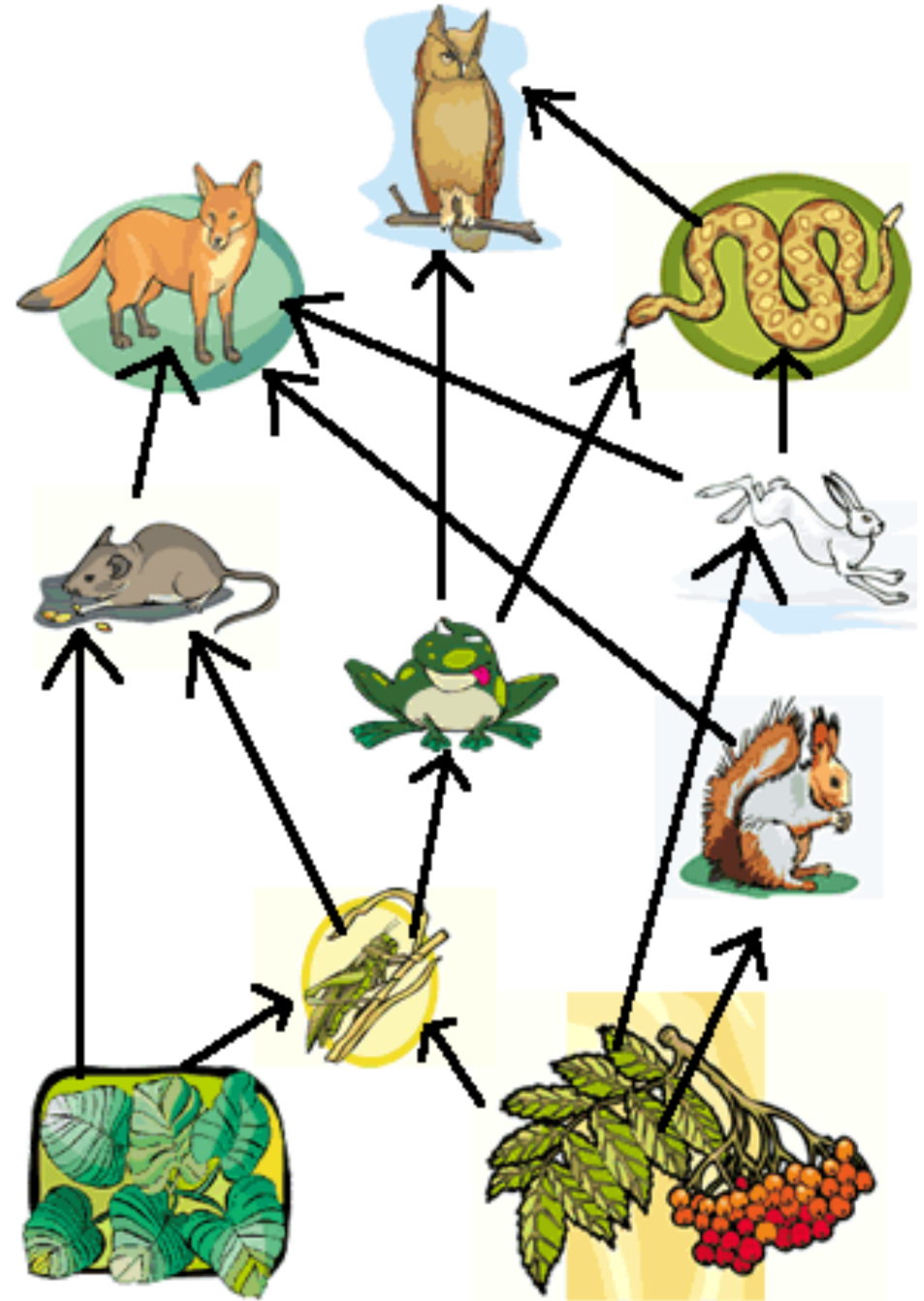
c) tundra



Primary Consumers
(1st)

Secondary Consumers
(2nd)

Tertiary Consumers
(3rd)

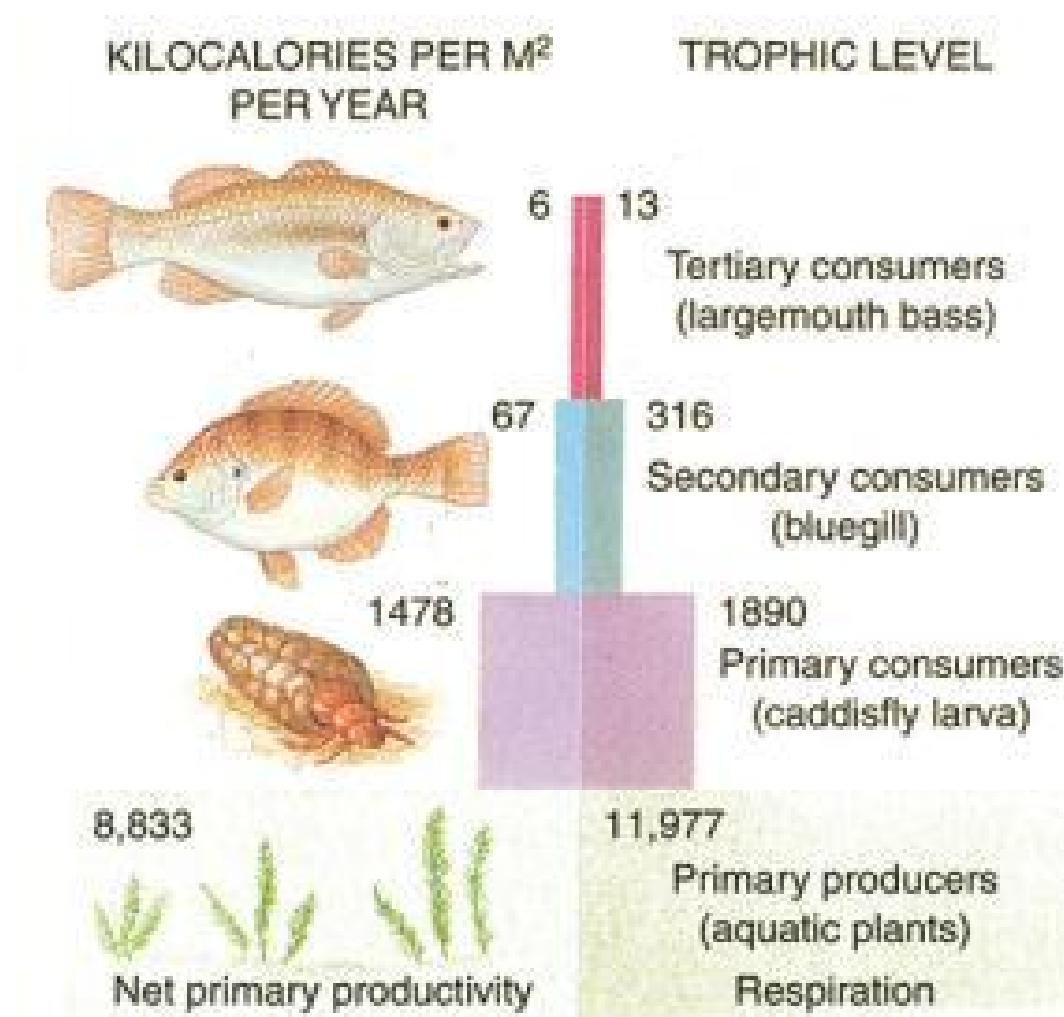


* Find the Omnivore.

Practice Another Food Web - Draw a lake ecosystem

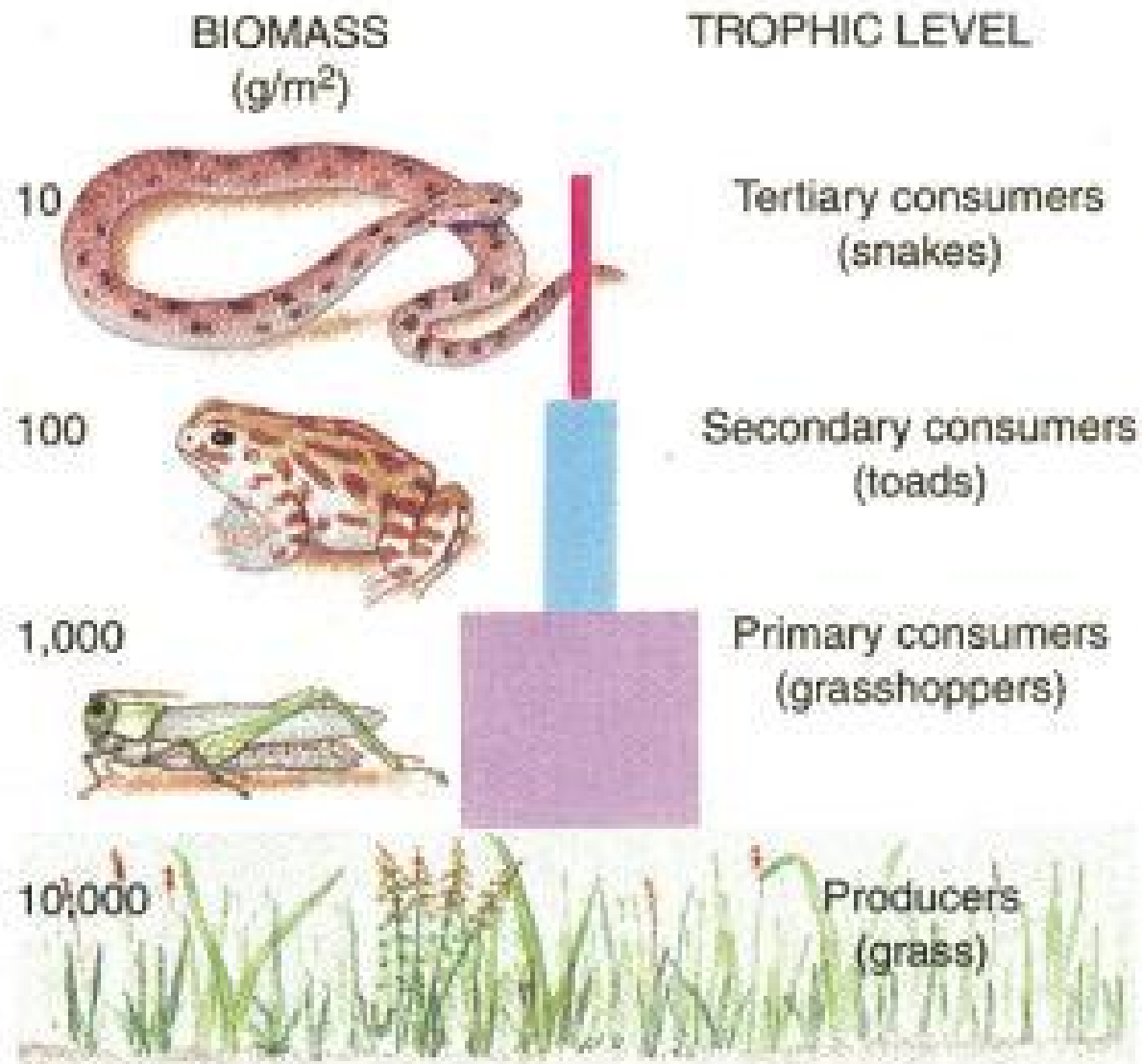
Ecological Pyramids (fig 3-9)

Energy Pyramid - shows how much energy is produced at each level.



Draw an energy pyramid for a prairie.

Pyramid of Numbers



Draw a pyramid of numbers for a lake.

*An ecosystem cannot support very many top predators!

3.3 Biogeochemical Cycles

(biology + geology + chemical)

Matter is not used up, it is transformed, the same molecules are passed around

Draw the Carbon Cycle

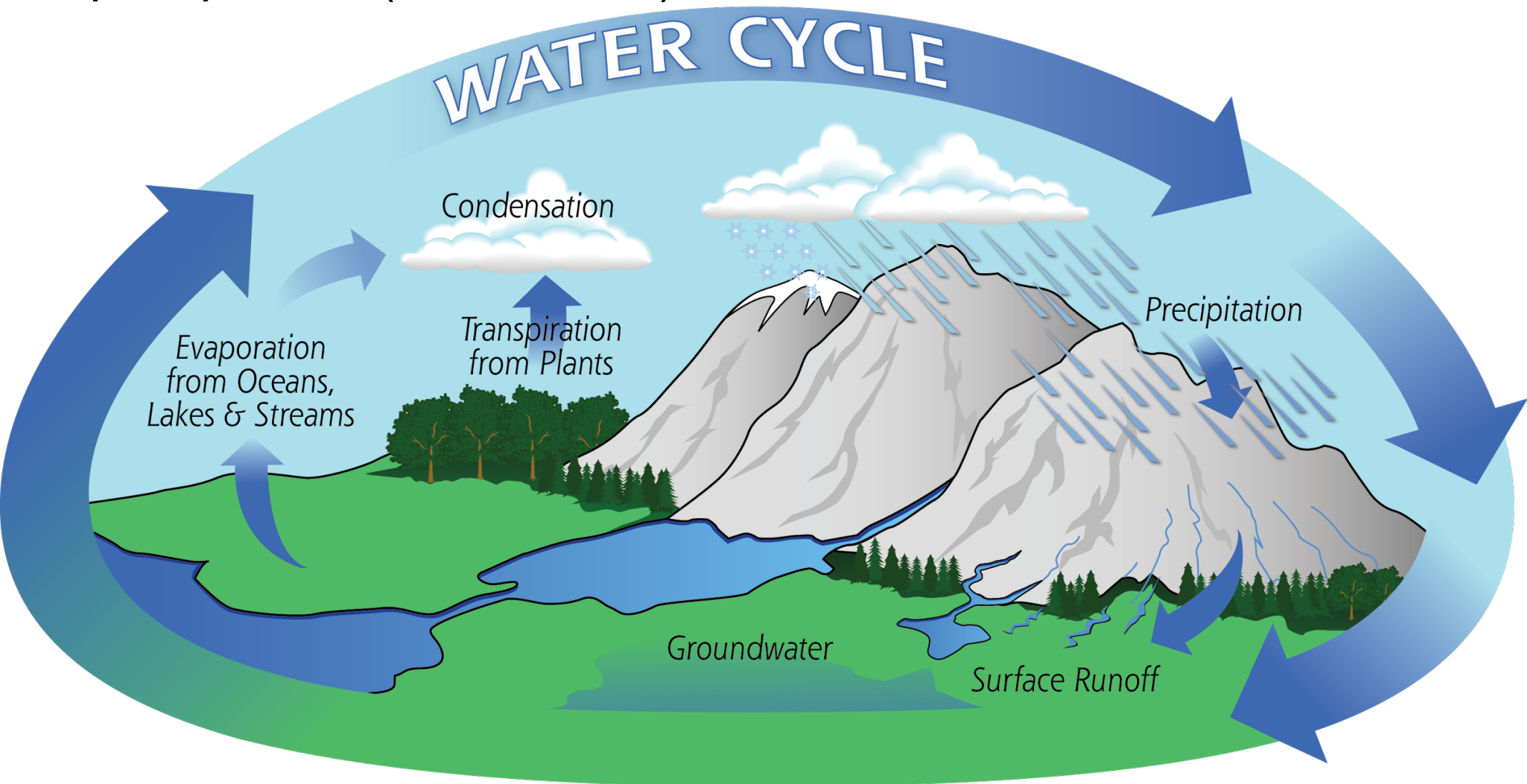
Water Cycle

ground water - water reserves

transpiration (from plants)

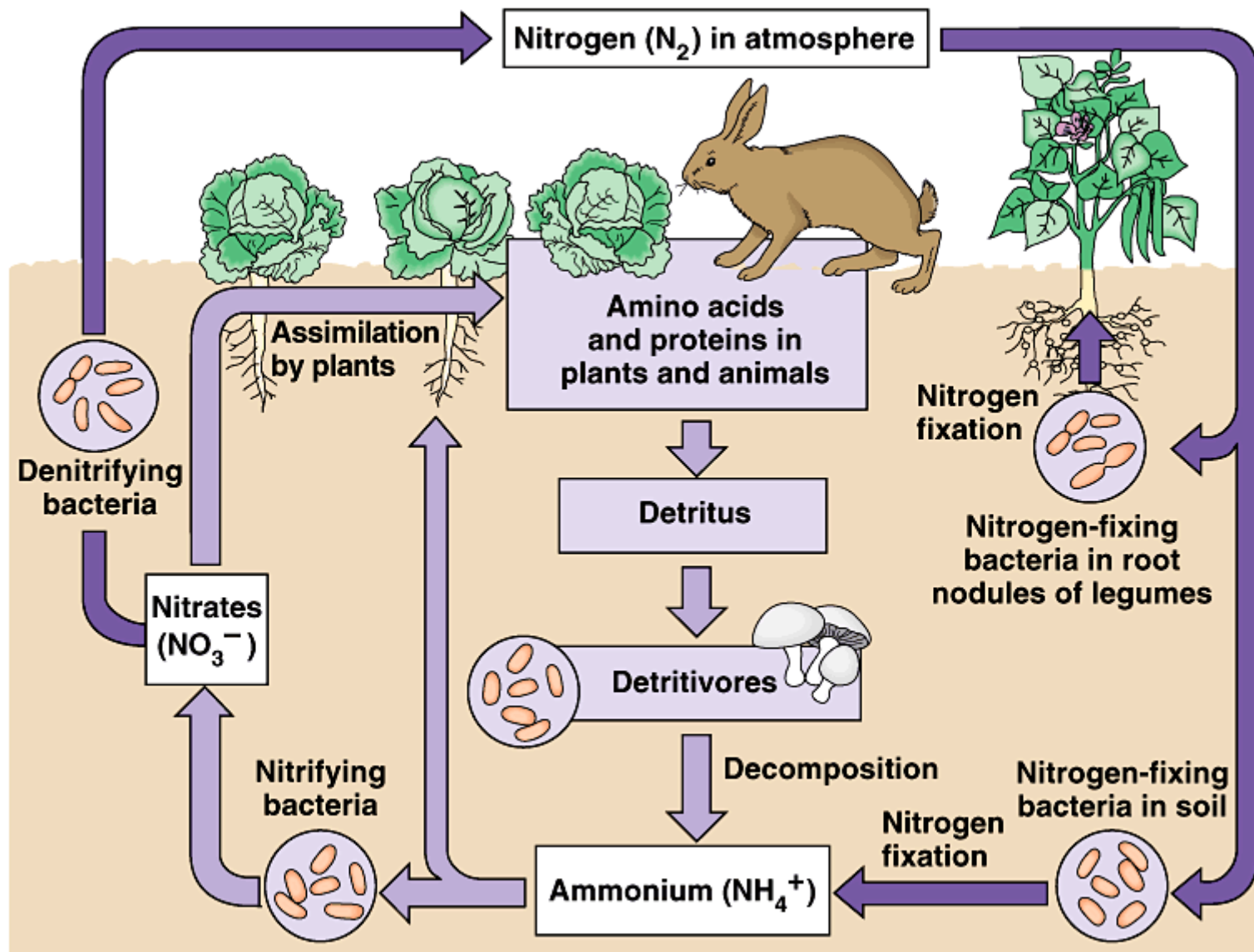
evaporation (from bodies of water)

precipitation (from clouds)



The Nitrogen Cycle

Earth's atmosphere is **78%** nitrogen, **21%** oxygen



Quick Check

1. An organism that only eats plants is called a _____

On a food web, this organism is also called a _____ consumer.

2. What human activities cause carbon to be released into the atmosphere?

3. An ecosystem can support a [small number / large number] of top predators.

4. In a pyramid of numbers, what type of organism makes up the base of the pyramid? [producers / consumers / predators]

5. When plants lose water from their leaves, it is called _____

6. When it rains, it is called _____

7. When liquid water turns into water vapor, it is called _____

8. What element makes up the majority of the earth's atmosphere?

a) carbon dioxide

b) nitrogen

c) oxygen

9. On a food web, secondary consumers are eaten by _____ consumers.

10. On a food web, arrows represent a) the flow of energy b) the passage of time